

COSEWIC
Status Appraisal Summary

on the

Warty Jumping-slug
Hemphillia glandulosa

in Canada

SPECIAL CONCERN
2013

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status appraisal summaries are working documents used in assigning the status of wildlife species suspected of being at risk in Canada. This document may be cited as follows:

COSEWIC. 2013. COSEWIC status appraisal summary on the Warty Jumping-slug *Hemphillia glandulosa* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xx pp.
(www.registrelep-sararegistry.gc.ca/default_e.cfm).

Production note:

COSEWIC acknowledges Kristiina Ovaska for writing the status appraisal summary on Warty Jumping-slug, *Hemphillia glandulosa*, in Canada. This status appraisal summary was overseen and edited by Gerald L. Mackie, Co-chair of the COSEWIC Molluscs Specialist Subcommittee.

For additional copies contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, ON
K1A 0H3

Tel.: 819-953-3215
Fax: 819-994-3684
E-mail: COSEWIC/COSEPAC@ec.gc.ca
<http://www.cosewic.gc.ca>

Également disponible en français sous le titre Sommaire du statut de l'espèce du COSEPAC sur la Limace-sauteuse glanduleuse (*Hemphillia glandulosa*) au Canada.

©Her Majesty the Queen in Right of Canada, 2013.
Catalogue No. CW69-14/2-36-2013E-PDF
ISBN 978-1-100-22498-5



Recycled paper



COSEWIC Assessment Summary

Assessment Summary – May 2013

Common name

Warty Jumping-slug

Scientific name

Hemphillia glandulosa

Status

Special Concern

Reason for designation

This small slug has a restricted range and patchy distribution on Vancouver Island, where it exists at the northern extremity of its range. Habitat loss and fragmentation, mainly from forestry activities, disturb the shady, moist forest floor conditions and coarse woody debris required by the slugs and may be restricting dispersal movements. Residential and recreational developments are emerging as a new threat on the southwest coast of the island. The low numbers of scattered populations render it vulnerable to both natural and human disturbances.

Occurrence

British Columbia

Status history

Designated Special Concern in May 2003. Status re-examined and confirmed in May 2013.



COSEWIC Status Appraisal Summary

Hemphillia glandulosa

Warty Jumping-slug

Jurisdiction: British Columbia

Limace sauteuse glanduleuse

Status History:

Designated Special Concern in May 2003. Status re-examined and confirmed in May 2013.

Evidence (indicate as applicable):

Increased survey effort has resulted in a small number of additional observations contributing to only slight changes in known EO and IAO. Threats have increased somewhat, but no new evidence of declines or loss of populations is available.

Wildlife species:

Change in eligibility, taxonomy or designatable units:

yes ☐ no ☒

Explanation:

There has been no change to the formal taxonomy, and the Canadian population of *Hemphillia glandulosa* remains as one designatable unit.

Wilke (2004) conducted genetic studies of mitochondrial DNA (COI, 16S) of the *Hemphillia glandulosa* – *H. burringtonii* complex. The study included specimens from throughout the slugs' range from southwestern B.C. (2 sites on Vancouver Island), western Washington, and northwestern Oregon. The analyses revealed the presence of two major clades and 15 subclades (8 of them known from single geographic sites in the U.S.), none of which corresponded to the divisions of the two nominal species as identified based on morphology. A subset of the specimens was dissected and found to be anatomically similar regardless of collection site, clade, or assignment to species. The Vancouver Island specimens belonged to the larger of the two major clades, the distribution of which extends southward through the Olympic Peninsula, Washington, to coastal Oregon, while the other major clade consisted of inland populations in Washington and Oregon. The Vancouver Island specimens grouped together in the same sub-clade with specimens from the northwest coast of the Olympic Peninsula but not with those from elsewhere on the peninsula. The author found no corroborating evidence for the division of the species-complex into *H. glandulosa* and *H. burringtonii* but noted that genetic distances among some of the lineages were sufficiently large to potentially warrant their elevation to species status. All specimens of this complex from Vancouver Island have been recorded previously as *H. glandulosa*, so this information does not affect the nomenclature used for the species in Canada.

Range:

Change in Extent of Occurrence (EO):

yes ☒ no ☐

Change in Area of Occupancy (IAO):

yes ☒ no ☐

Change in number of known or inferred current locations:

yes ☒ no ☐

Significant new survey information

yes ☒ no ☐

Explanation:

Numerous surveys for terrestrial gastropods have been conducted on Vancouver Island since the preparation of the previous status report on *H. glandulosa* (COSEWIC 2003) (Appendix 1). They include

annual surveys in the Capital Regional District (CRD) Parks and Trails System since 2006 (Ovaska and Sopuck 2006a, 2007b, 2008b, 2009a, 2010, 2012), which focused on detecting the Blue-grey Taildropper (*Prophysaon coeruleum*), a species that co-occurs with *H. glandulosa* at some sites and occupies similar moist microhabitats on the forest floor. Surveys have also been conducted in Pacific Rim National Park, including both Long Beach and West Coast Trail units (Ovaska and Sopuck 2005, 2007d), other federal lands (Ovaska and Sopuck 2007a, 2009c), experimental forestry sites (Ovaska and Sopuck 2006c, 2007c, 2008c), and as part of fieldwork for terrestrial gastropods at risk in various parts of the island and adjacent areas (Ovaska and Sopuck 2004a, 2006b, 2008a). Surveys in the Pacific Rim National Park and those initiated by the B.C. Ministry of Environment (Ovaska and Sopuck 2006b) focused on potential habitats of the Dromedary Jumping-slug (*H. dromedarius*), a species which shows overlap in habitats and sometimes co-occurs with *H. glandulosa*.

The above surveys have resulted in 11 new records of *H. glandulosa* from 2003 – 2011; 2 of the records are from known sites, and the remaining are from 4 new sites (Appendix 2). The new sites are Noyse Creek (1 record each from 2 sub-sites) and Bamfield (2 records), both on the west coast of the island, East Sooke Regional Park (1 record each from 3 sub-sites), and Galloping Goose Trail right-of-way near Sooke River (2 records). The latter two records extend the species' known Canadian distribution slightly to the southeast. The new sites also slightly expand the known index of area of occupancy. However, these changes are the result of increased search effort, and there is no reason to suspect that the slugs have expanded their distribution. The slugs were still found at the small number of sites that have been revisited on the moist southwest coast of the island, with the exception of one site (Pachena Bay; Appendix 2). In total, including the 4 new sites, the species is now known from 17 sites, 3 of which are historical only (Figure 1; Appendix 2).

Population Information:

Change in number of mature individuals:

yes ☐ no ☒

Change in total population trend:

yes ☐ no ☒

Change in severity of population fragmentation:

yes ☐ no ☒

Change in trend in area and/or quality of habitat:

yes ☐ no ☒

Significant new survey information

yes ☒ no ☐

Explanation:

The number of mature individuals remains unknown, and there are few data on abundance. At most sites, only a small number of individuals have been found (Appendix 2), although the slugs can be locally abundant in suitable moist sites in some areas (COSEWIC 2003). The distribution of the species is notoriously patchy both at local and broader scales. It may be more continuous in moist coastal forests along the west coast of Vancouver Island (COSEWIC 2003), but these forests have been extensively fragmented from logging. Populations in the interior and east coast of the island are isolated from each other by human developments, rugged terrain, or otherwise unsuitable habitat and may be small. It is unknown whether the populations are severely fragmented, as defined by IUCN, but this is a possibility. There is no information on population trends. A continuing decline in habitat quality and quantity due to forestry and residential development suggests a historical and continuing but undocumented decline in population size (see **Threats**).

Threats:

Change in nature and/or severity of threats:

yes ☒ no ☐

Explanation:

Forestry was previously identified as a threat to *H. glandulosa* (COSEWIC 2003), and logging continues to modify habitats throughout the species' range on Vancouver Island. The rate of forest loss on Vancouver Island is the highest in the province; the net change in the extent of older (>140 years) forest, taking into account recruitment, was 25.8% in the west and north and 24.0% in the east of the island over the 30-year-period from 1978 – 2008 (Model 3 in Long *et al.* 2011; calculated for areas within 50 km from the coast). Logging is ongoing in remnant old growth and maturing second-growth forests on the island,

including habitats of this species. Although the slugs are not restricted to older forests, they require suitable moist forest floor conditions and refuges, such as provided by coarse woody debris, that are disturbed during logging. Furthermore, newly logged areas could create barriers to gene flow and decrease connectivity among habitat patches and populations.

Residential and recreational developments are emerging as a new threat in the coastal forests on western Vancouver Island, from Sooke to Port Renfrew, where most of the distribution records and the largest stretch of continuous habitat for this species exist. A large tract of privately owned forestry land (28,000 ha) in this area was removed from the Tree Farm Licence agreement by the B.C. provincial government in 2007, so permitting the forestry company managing the land (Western Forest Products) to subdivide and sell the land (Office of the Auditor General of British Columbia 2008). Since then, approximately one quarter of the property has been bought by another forestry company (TimberWest); approximately 2350 ha has been bought by the Capital Regional District to be added to parks or recreational areas (ELC 2010); a parcel has been bought by developers, but the remainder is still for sale. The implications of changes in land ownership and, in some cases land use, for *H. glandulosa* are unknown, but there is potential for increased disturbance of habitat and subpopulations throughout this area.

Protection:

Change in effective protection:

yes ☐ no ☒

Explanation:

There is no change in effective protection. *Hemphillia glandulosa* was assessed as Special Concern by COSEWIC in 2003 and is listed in Schedule 1 of the *Species at Risk Act*. A management plan required under the Act has been drafted (BC Ministry of Environment 2007) but is still to be finalized. The species is recommended for inclusion in the category of "species at risk" under the provincial *Forest and Range Practices Act*. As such its management on Crown forestry lands will be guided by an Identified Wildlife Management Strategy (IWMS). An IWMS account for the species is in preparation but has not been posted.

Of the 14 sites considered to be extant, two are within provincial parks (Juan de Fuca Provincial Park: Parkinson Creek; Carmanah Walbran Provincial Park) and two (East Sooke Regional Park and Galloping Goose Trail by Sooke River) are within the Capital Regional District Parks and Trails System; however, the Galloping Goose Trail site is within a narrow right-of-way of a heavily used trail and is surrounded by private rural residential land. There is a 1984 record from the Pacific Rim National Park (Pachena Bay), but the species has not been found there subsequently despite repeated surveys. The remaining sites are on unprotected private or Crown lands, used mainly for forestry.

Rescue Effect:

Evidence of rescue effect:

yes ☐ no ☒

Explanation:

No change in rescue effect has occurred. The probability of rescue remains *nil*, as the species is known only from Vancouver Island, separated by stretches of ocean from nearest populations in the U.S.

Quantitative Analysis:

Change in estimated probability of extirpation:

yes ☐ no ☒

Details:

No quantitative analyses are available.

Summary and Additional Considerations: [e.g., recovery efforts]

The Warty Jumping-slug is known from 17 sites, 3 of which are historical. Numerous surveys on southern Vancouver Island over the past 10 years have resulted in only a few additional records. However, much potential habitat in the interior and west coast of the island remains unsearched. Additional occupied sites almost certainly exist but remain undocumented as the slugs are small (approximately 2 cm in length), cryptic, and easy to miss unless specifically targeted. Most known occurrences and much potential habitat are unprotected, and threats have increased along the portion of the west coast of Vancouver Island that is deemed most productive for this species. A draft Management Plan and an Identified Wildlife Management Strategy account have been prepared by the B.C. Ministry of Environment, but these plans remain to be posted and implemented.

Consultations:

The following individuals were contacted via email.

*Denotes that information was provided by authority contacted.

Cunnigton, David. December 2011. Environment Canada, Canadian Wildlife Service, Delta, BC

*Gelling, Lea. September 2011. B.C. Conservation Data Centre, Ministry of Environment Victoria, B.C.

*Heron, Jennifer. September 2011. Invertebrate Specialist. B.C. Ministry of Environment, Terrestrial Ecosystems Science Section, Victoria, B.C.

Reader, Brian. December 2011. Parks Canada – Gulf Islands National Park Reserve, Victoria, B.C.

*Sopuck, Lennart. September – November 2011. Biologist. Biolinx Environmental Research Ltd. Sidney, B.C.

*Stipek, Katrina. November 2011 – January 2012. B.C. Conservation Data Centre, Ministry of Environment Victoria, B.C.

Vennesland, Ross. December 2011. Species at Risk Recovery Specialist. Parks Canada - Western and Northern Service Centre, Vancouver, B.C.

Sources of information (including references in appendices):

BC Ministry of Environment. 2007 (draft). National management plan for the Warty Jumping-slug, *Hemphillia glandulosa*, in British Columbia. Province of British Columbia, Victoria, B.C. Cameron, R.A.D. 1986. Environment and diversities of forest snail faunas from coastal British Columbia. *Malacologia* 27:341–355.

Cameron, R.A.D. 2001. Personal communication with Robert Forsyth for 2003 COSEWIC status report on Warty Jumping-slug. Department of Animal and Plant Sciences, University of Sheffield, Sheffield, United Kingdom S10 2TN, E-mail: robert@vicshef.freemove.co.uk.

- COSEWIC. 2003. COSEWIC 2003. COSEWIC assessment and status report on the Warty Jumping-slug *Hemphillia glandulosa* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 19 pp.
- ELS (Environmental Law Centre, University of Victoria). 2010. Major Victory for southern Vancouver Island's west coast. Web site: <http://www.elc.uvic.ca/press/TFL-deletions.html> [accessed January 2012].
- Hanham, A.W. 1914. Notes on mollusks from British Columbia. *The Nautilus* 28:87–88.
- Long, J.A., S.L. Hazlitt, T.A. Nelson, and K. Labere. 2010. Estimating 30-year change in coastal old-growth habitat for a forest-nesting seabird in British Columbia, Canada. *Endangered Species Research* 14:49-59.
- Hanham, A.W. 1926. *Hemphillia malonei* Van. *The Nautilus* 39:143–144.
- Office of the Auditor General of British Columbia. 2008. Removing private land from tree farm licences 6, 19 & 21. Protecting the public interest? Web site: <http://www.bcauditor.com/pubs/2008/report5/removing-private-land-tree-farm-licences-6-19-25-protecti> [accessed January 2012].
- Ovaska, K., R. Forsyth, and L. Sopuck. 2001. Surveys for rare and potentially endangered terrestrial gastropods in southwestern British Columbia, April–October 2000, 2001. Endangered Species Recovery Fund, Final Report, Project #ESR189 & Wildlife Habitat Canada, Project #10.138F.1R-01102. 23 pp.
- Ovaska, K., and L. Sopuck. 2004a. Distribution and status of rare forest slugs in western Canada Results of 2003 and 2004 field seasons. Report prepared by Biolinx Environmental Research Ltd. for Endangered Species Recovery Fund (World Wildlife Fund and Environment Canada). 75 pp.
- Ovaska, K., and L. Sopuck. 2004b. Terrestrial gastropods as indicators for monitoring ecological effects of variable-retention logging practices. Pre-disturbance surveys at experimental sites, May – November 2003. Report prepared by Biolinx Environmental Research Ltd. for Weyerhaeuser Company Limited, Nanaimo, British Columbia. 49 pp.
- Ovaska, K., and L. Sopuck. 2005. Surveys for terrestrial gastropods in the Pacific Rim, Gulf Islands, and Gwaii Haanas National Park Reserves. Report prepared by Biolinx Environmental Research Ltd for Parks Canada, Coastal British Columbia Field Unit, Victoria, British Columbia. 108 pp.
- Ovaska, K., and L. Sopuck. 2006a. Surveys for the Blue-grey Taildropper and other gastropods at risk within CRD parks and trail systems in 2006. Report prepared by Biolinx Environmental Research Ltd. for Capital Regional District Parks, Victoria, BC. 45 pp.
- Ovaska, K., and L. Sopuck. 2006b. Surveys of potential Wildlife Habitat Areas for terrestrial gastropods at risk on Vancouver Island, September - November 2006. Report prepared by Biolinx Environmental Research Ltd. for the Ministry of Environment, Victoria, British Columbia. 37 pp.

- Ovaska, K., and L. Sopuck. 2006c. Terrestrial gastropods as focal species for monitoring ecological effects of variable-retention logging practices - Summary of post-logging surveys, 2005 field-season. Report prepared by Biolinx Environmental Research Ltd. for Cascadia Forest Products, Nanaimo British Columbia. 40 pp.
- Ovaska, K., and L. Sopuck. 2007a. Surveys for the Blue-grey Taildropper slug (*Prophysaon coeruleum*) on federal lands on southern Vancouver Island, BC, fall 2007. Report prepared by Biolinx Environmental Research Ltd. for CFS/CFB Esquimalt Natural Resources Program, Victoria, British Columbia. 49 pp.
- Ovaska, K., and L. Sopuck. 2007b. Surveys for the Blue-grey Taildropper within CRD Parks and Trails System in 2007. Progress report prepared by Biolinx Environmental Research Ltd. for CRD Parks, Victoria, British Columbia. 14 pp.
- Ovaska, K., and L. Sopuck. 2007c. Terrestrial gastropods as focal species for monitoring ecological effects of variable-retention logging practices. 2006 field season. Report prepared by Biolinx Environmental Research Ltd. for Western Forest Products, Campbell River, British Columbia. 45 pp.
- Ovaska, K., and L. Sopuck. 2007d. Surveys for terrestrial gastropods at risk in Pacific Rim National Park Reserve, 2006. Report prepared by Biolinx Environmental Research Ltd for Parks Canada, Western and Northern Service Centre, Victoria, B.C. 44 pp.
- Ovaska, K., and L. Sopuck. 2008a. Summary of fieldwork associated with COSEWIC status report for Threaded Vertigo. Report prepared by Biolinx Environmental Research Ltd. for COSEWIC (Mollusc Specialist Sub-committee), COSEWIC, Ottawa, Ontario. 13 pp. + appendices
- Ovaska, K., and L. Sopuck. 2008b. Surveys for the Blue-grey Taildropper and other gastropods at risk within the CRD Parks and Trails System in 2008. Report prepared by Biolinx Environmental Research Ltd. for CRD Parks, Victoria, British Columbia. 61 pp.
- Ovaska, K., and L. Sopuck. 2008c. Terrestrial gastropods as focal species for monitoring ecological effects of variable-retention logging practices. Synopsis of the complete project and results for the 2007 field season. Report prepared by Biolinx Environmental Research Ltd. for Western Forest Products, Campbell River, British Columbia. 39 pp.
- Ovaska, K., and L. Sopuck. 2009a. Surveys for the Blue-grey Taildropper and other gastropods at risk within the CRD Regional Parks and Trails System in 2009. Report prepared by Biolinx Environmental Research Ltd. for CRD Parks, Victoria, British Columbia. 36 pp.
- Ovaska, K., and L. Sopuck. 2009b. Surveys for the Blue-grey Taildropper and other gastropods at risk at DND's Royal Roads property, autumn 2009. Report prepared by Biolinx Environmental Research Ltd. for Department of National Defence, Formation Safety and Environment (CFB Esquimalt), Victoria, British Columbia. 12 pp.

- Ovaska, K., and L. Sopuck. 2009c. Surveys for the Blue-grey Taildropper slug (*Prophysaon coeruleum*) on federal lands on southern Vancouver Island in 2008. Report prepared by Biolinx Environmental Research Ltd. for CFS/CFB Esquimalt Natural Resources Program, Victoria, British Columbia. 124 pp.
- Ovaska, K., and L. Sopuck. 2010. Surveys for the Blue-grey Taildropper and other gastropods at risk with focus on Capital Regional District Parks, fall 2010. Report prepared by Biolinx Environmental Research Ltd. for Habitat Acquisition Trust, Victoria, British Columbia. 31 pp.
- Ovaska, K., and L. Sopuck. 2011. Surveys for the Blue-grey Taildropper and other gastropods at risk with focus on Capital Regional District Parks, fall 2011. Report prepared by Biolinx Environmental Research Ltd. for Habitat Acquisition Trust, Victoria, British Columbia. 30 pp.
- Pilsbry, H.A. 1948. Land Mollusca of North America (north of Mexico). *The Academy of Natural Sciences of Philadelphia, Monograph* 3, 2(2): i–xlvii, 521–1113.
- Reise, H. 2001. Personal communication with Robert Forsyth for 2003 COSEWIC status report on Warty Jumping-slug. Staatliches Museum für Naturkunde Görlitz, PF 300 154, 02806 Görlitz, Germany. Tel: +49(0)3581/4760410, Fax: 4760101, E-mail: smng.reise@t-online.de.
- Taylor, G.W. 1900. *Hemphillia glandulosa*. A slug new to the Canadian list. *The Ottawa Naturalist* 14:150–151.
- Wilke, T. 2004. Genetic and analytical analysis of the jumping-slugs. Final report (contract 43-05G2-1-10086). Report prepared for the Olympic National Forest, Olympia, Washington, USA. 26 pp.
- Author of Status Appraisal Summary: Kristiina Ovaska

TECHNICAL SUMMARY

Hemphillia glandulosa

Warty Jumping-slug

Range of occurrence in Canada: British Columbia

Limace sauteuse glanduleuse

Demographic Information

Generation time	Probably 1 year
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals? - Decline is possible based on loss of habitat, but no information is available.	Unknown but possible
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	No
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence - Calculated by Katrina Stipeck, BC Conservation Data Centre in January 2011, using alpha-hull method	5,127 km ²
Index of area of occupancy (IAO) (Always report 2x2 grid value). - Calculated by Jenny Wu, Environment Canada, February 13, 2013, excluding 2 historical (prior to 1980) records - This value is based on known occurrences; the actual IAO is larger, as much potential habitat remains unsurveyed and the species is unlikely to be found unless specifically searched for. However, because of the patchy distribution of the species and its apparent absence over large tracts of land in drier forest within the Coastal Douglas-fir biogeoclimatic zone in the south and east of the island, the IAO is unlikely to be more than 2000 km ² , which would represent 39% of the EO.	104 km ² (discrete IAO); continuous IAO is larger but most likely <2000 km ²
Is the total population severely fragmented? - No information exists on viability of populations. Habitat is extensively fragmented from natural and anthropogenic causes, but the small body size of the slugs may allow them to persist in small habitat patches.	Unknown
Number of locations* - Each of 14 sites (3 historical sites omitted) probably corresponds to a separate location because each is under different management regime and subjected to different threat events	14, based on known occurrences
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No

* See Definitions and Abbreviations on [COSEWIC website](#) and [IUCN 2011](#) for more information on this term.

Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy? - Decline is possible based on habitat loss, but no information is available.	Probably
Is there an [observed, inferred, or projected] continuing decline in number of populations? - Decline is possible based on habitat loss, but no information is available.	Possibly
Is there an [observed, inferred, or projected] continuing decline in number of locations*? - Decline is possible based on habitat loss, but no information is available.	Possibly
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	Yes
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations*?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population	N Mature Individuals
Total	Unknown; probably 1000s

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Not done
--	----------

Threats (actual or imminent, to populations or habitats)

Habitat loss, degradation, and fragmentation from forestry activities and residential and recreational developments

Rescue Effect (immigration from outside Canada)

Status of outside population(s)?	
Is immigration known or possible?	No
Would immigrants be adapted to survive in Canada?	Probably
Is there sufficient habitat for immigrants in Canada?	Unknown
Is rescue from outside populations likely?	No

Status History

Designated Special Concern in May 2003. Status re-examined and confirmed in May 2013.

Status and Reasons for Designation

Status: Special Concern	Alpha-numeric Code: Not applicable
Reasons for Designation: This small slug has a restricted range and patchy distribution on Vancouver Island, where it exists at the northern extremity of its range. Habitat loss and fragmentation, mainly from forestry activities, disturb the shady, moist forest floor conditions and coarse woody debris required by the slugs and may be restricting dispersal movements. Residential and recreational developments are emerging as a new threat on the southwest coast of the island. The low numbers of scattered populations render it vulnerable to both natural and human disturbances.	

* See Definitions and Abbreviations on [COSEWIC website](#) and [IUCN 2011](#) for more information on this term.

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Possible based on habitat loss, but the magnitude of decline is unknown.
Criterion B (Small Distribution Range and Decline or Fluctuation): EO and IAO are below critical thresholds, but the number of locations is greater than thresholds, severe fragmentation cannot be substantiated, and there are no extreme fluctuations.
Criterion C (Small and Declining Number of Mature Individuals): Population size is unknown but is most likely greater than the thresholds, and declines are undocumented.
Criterion D (Very Small or Restricted Total Population): Population size is unknown but is most likely greater than the threshold.
Criterion E (Quantitative Analysis): Not conducted due to lack of data on key parameters.

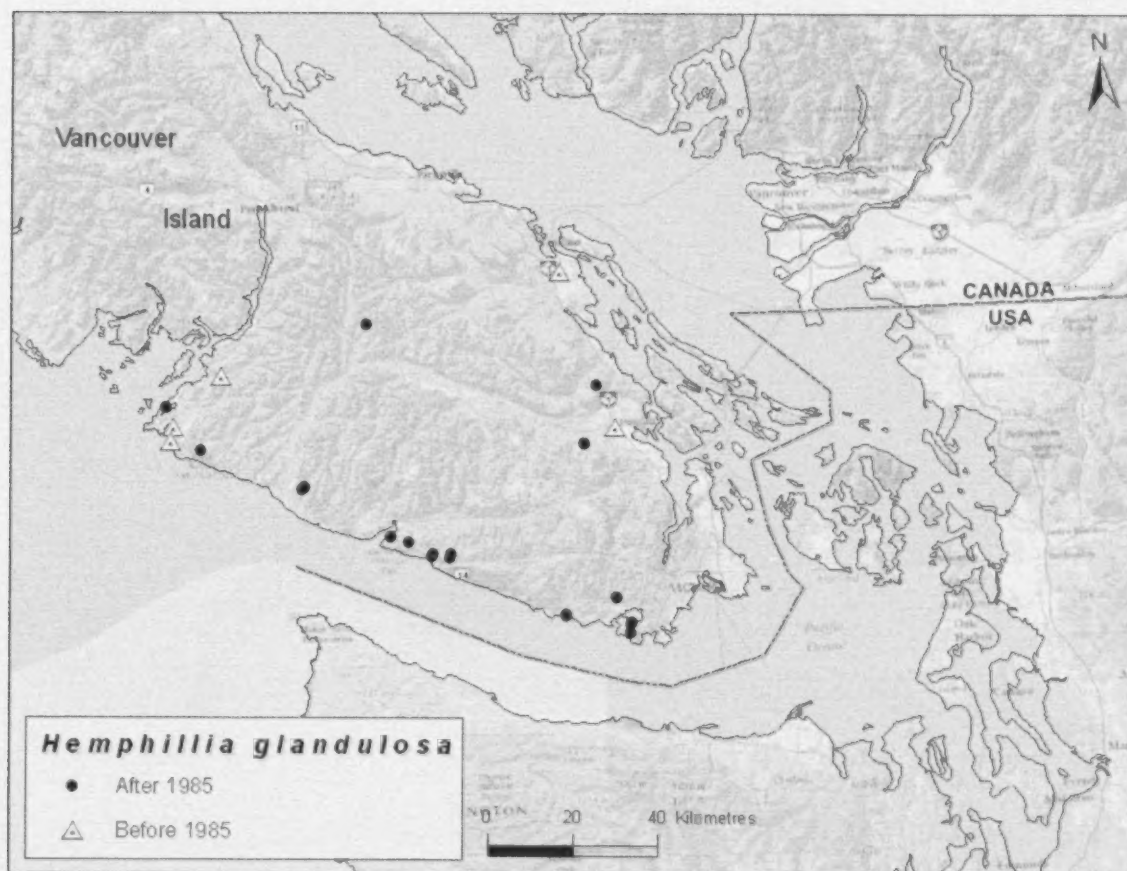


Figure 1. Canadian distribution of the Warty Jumping-slug on southern Vancouver Island.

Appendix 1. Summary of search effort for terrestrial gastropods on Vancouver Island and vicinity since the previous COSEWIC assessment of the Warty Jumping-slug in 2003.

Year	Survey area	# properties	Survey method	Sampling effort	# of sites where the species found	# of individuals found	Comments	Source
2011	Capital Regional District Parks; 1 private residential property	9	Cardboard cover-objects	16 transects; 313 cover-objects checked repeatedly; 900 cover-object flips	1	1		Ovaska and Sopuck 2011
2010	Capital Regional District Parks; 1 private residential property	6	Cardboard cover-objects	18 transects; 370 cover-objects checked repeatedly; 1460 cover-object flips	0	0		Ovaska and Sopuck 2010
2009	Capital Regional District Parks	7	Cardboard cover-objects	22 transects; 440 cover-objects checked repeatedly; 1620 cover-object flips	1	1		Ovaska and Sopuck 2009a
2009	DND property at Royal Road University	1	Cardboard cover-objects	5 transects; 100 cover-objects checked repeatedly; 400 cover-object flips	0	0		Ovaska and Sopuck 2009b
2008	Federal lands within Capital Regional District	6	Cardboard cover-objects	3 intensively sampled grids and 26 transects; total of 5540 cover-object flips	0	0		Ovaska and Sopuck 2009c
2008	Vancouver Island (south and east coast); Sunshine Coast on mainland B.C.	17	Time-constrained searches	20.3 person-hours (16.1 h at 13 sites on Vancouver Island; 4.2 h at 4 sites on Sunshine coast)	0	0		Ovaska and Sopuck 2008a
2008	Capital Regional District Parks	6	Cardboard cover-objects	22 transects; 440 cover-objects checked repeatedly; 2360 cover-object flips	0	0		Ovaska and Sopuck 2008b
2007	Vancouver Island (north-central, Moakwa); Sunshine Coast (Goat Island)	2 (38 subsites)	Cardboard cover-objects	1488 cover-objects at 384 sampling stations checked repeatedly; 5952 cover-object flips (688 cover-objects and 2752 flips at the Vancouver Island site)	0	0	Appr. 100 ha sites monitored intensively as part of experimental forestry project (post-logging surveys and riparian experiment)	Ovaska and Sopuck 2008c
2007	Federal lands within Capital Regional District	6	Cardboard cover-objects	23 transects; 460 cover-objects; total of 1840 cover-object flips	0	0		Ovaska and Sopuck 2007a
2007	Capital Regional District Parks	3	Cardboard cover-objects; Time-constrained searches	6 transects; 120 cover-objects; total of 260 cover-object flips; 160 person-minutes search of forest floor	0	0		Ovaska and Sopuck 2007b
2006	Vancouver Island (north; Port McNeill; Haida Gwaii)	2 (40 subsites)	Cardboard cover-objects	1600 cover-objects at 400 sampling stations checked repeatedly; 7200 cover-object flips (800 cover-objects and 4800 flips at the Vancouver Island site)	0	0	Appr. 100 ha sites monitored intensively as part of experimental forestry project (post-logging surveys)	Ovaska and Sopuck 2007c
2006	Vancouver Island (west coast)	2 (21 subsites)	Time-constrained searches (day & night); cardboard cover-objects	96.9 person-hours, of which 32.7 h were spent repeatedly inspecting 480 cardboard cover-objects at 12 transects (1920 cover-object flips).	0	0	Pacific Rim National Park (Long Beach and West Coast Trail units)	Ovaska and Sopuck 2007d

Year	Survey area	# properties	Survey method	Sampling effort	# of sites where the species found	# of individuals found	Comments	Source
2006	Capital Regional District Parks	5	Cardboard cover-objects	20 transects; 400 cover-objects; total of 1390 cover-object flips	1	2		Ovaska and Sopuck 2006a
2006	Vancouver Island (south and central with focus on the west coast)	30	Time-constrained searches	40.6 person-hours of intensive search	3	8		Ovaska and Sopuck 2006b
2005	Vancouver Island (north, Tsilika); Sunshine Coast (Horseshoe Lake)	2 (35 subsites)	Cardboard cover-objects	1400 cover-objects at 350 sampling stations checked repeatedly; 2580 cover-object flips (800 cover-objects and 2400 flips at the Vancouver Island site)	0	0	Appr. 100 ha sites monitored intensively as part of experimental forestry project (post-logging surveys)	Ovaska and Sopuck 2006c
2003 2004	Vancouver Island (west coast); Gulf Islands (North Pender and Saturna)	Vancouver Island: 2 (35 subsites) Gulf Islands: 15	Time- and area-constrained searches (day & night); cardboard cover-objects	Vancouver Island: 119.7 person-hours Gulf Islands: 44.5 person-hours; inspection of 160 cardboard cover-objects at 8 transects	0	0	Surveys in Pacific Rim National Park (Long Beach and West Coast Trail units) and Gulf Islands National Park Reserve (North Pender and Saturna islands). Additional surveys in Haida Gwaii as part of this project are not included.	Ovaska and Sopuck 2005
2003 2004	Vancouver Island (south); Lower Mainland	43	Time- and area-constrained searches (day & night); cardboard cover-objects	55.3 person-hours; 260 cardboard cover-objects at 28 sites inspected repeatedly (880 cover-object flips)	2	5	Most sites (39) were on Vancouver Island; 4 were in Lower Mainland. Additional surveys conducted in Haida Gwaii as part of this project are not included here.	Ovaska and Sopuck 2004a
2003	Vancouver Island (north-central, Moakwa); Sunshine Coast (Goat Island)	2 (36 subsites)	Cardboard cover-objects	1440 cover-objects at 360 sampling stations checked repeatedly; 4320 cover-object flips (480 cover-objects and 1440 flips at the Vancouver Island site)	0	0	Appr. 100 ha sites monitored intensively as part of experimental forestry project (pre-logging surveys)	Ovaska and Sopuck 2004b

Appendix 2. Distribution records for *Hemphillia glandulosa* in Canada up to 2011; compiled from COSEWIC (2003) status report, BC Conservation Centre records, and surveys by Biolinx Environmental Research Ltd.

Site #	Site	Latitude (N)	Longitude (W)	Land Status	Date	# of slugs	Search effort	Population status (year of last obs.)	Source of record
Records compiled for COSEWIC (2003) status report:									
1	ca. 3 mi [4.8 km] from mouth of Nanaimo River	49°06'	123°52'	Private	October 1, 1900	12	Unknown	Historical only; habitat extensively modified	Taylor 1900 (repeated by Hanham 1926; Pilsbry 1948) ¹
2	Corvichan [sic! Cowichan] River	48°46.3'	123°42'	Private	Unknown [on two occasions; before 1913?]	"only in small numbers"	Unknown	Historical only	Hanham 1914 (repeated by Hanham 1926; Pilsbry 1948)
3a	"Locality 31" = Pachena Bay	48°47.4'	125°07.0'	Federal (National Park Reserve)	Aug-84	not available	Unknown	Historical only; some recent surveys conducted in the vicinity	Cameron 1986 [pers. comm. 2001]
3b	"Locality 32" = Pachena Bay	48°45.7'	125°07.4'	Federal (National Park Reserve)	Aug-84	not available	Unknown	Historical only; some recent surveys conducted in the vicinity	Cameron 1986 [pers. comm. 2001]
4	"Locality 33" = Sarita S of Mt. Blenheim	48°53.75'	124°57.47'	BC Crown	Aug-84	not available	Unknown	Historical but persist in the general area (2001; see Site 8)	Cameron 1986 [pers. comm. 2001]
5	Cerantes Road near Snuggery Cove, Port Renfrew	48°33.17'	124°25.29'	Private (rural residential)	24-Oct-98	4	ca. 30 person-minutes	Found there again in 2001	RBCM ² 998-00326-002
5	Cerantes Road near Snuggery Cove, Port Renfrew	48°33.17'	124°25.29'	Private (rural residential)	11-Oct-01	6	60 person-minutes	No further surveys	SMNG ³ (Reise pers. comm. 2001)
6	Parkinson Creek Road at Hwy. 14	48°32.53'	124°21.94'	BC Crown (Juan de Fuca Provincial Park)	14-Apr-00	3 (1 specimen in RBCM)	90 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001; RBCM 000-00132-002 ³
7a	Carmanah Creek valley	48°39.6'	124°41.6'	BC Crown (Park)	27-Sep-00	1	60 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001
7b	Carmanah Creek valley	48°39.4'	124°42.2'	BC Crown (Park)	27-Sep-00	1	15 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001
8	N of Sarita	48°44.4'	125°01.5'	BC Crown (forestry)	23-May-01	2	60 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001
9a	Branch of Sombrio River, Hwy. 14, ca. 11 km SE of Port Renfrew	48°30.6'	124°17.44'	BC Crown	15-Jun-01	1	30 person-minutes	In 2006, found on opposite side of HWY	Ovaska <i>et al.</i> 2001
10	S shore, Holyoak Lake, Mt. Brenton	48°51.72'	123°45.27'	Private forestry	25-Aug-01	3	60 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001
11	Unnamed lake, Mt. Hooper, ca. 20 km NW of Youbou	48°59.99'	124°29.32'	Private forestry	10-Sep-01	3	100 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001
12	Muir Creek, Hwy. 14, ca. 5 km E of Shirley	48°22.81'	123°51.94'	Private	11-Oct-01	>15	ca. 30 person-minutes	2003; continues to be easily found	SMNG ⁴ (Reise pers. comm. 2001)

¹ Approximate location

² Royal British Columbia Museum collection

³ Staatliches Museum für Naturkunde Görlitz collection

⁴ Staatliches Museum für Naturkunde Görlitz collection

Site #	Site	Latitude (N)	Longitude (W)	Land Status	Date	# of slugs	Search effort	Population status (year of last obs.)	Source of record
12	Muir Creek, Hwy. 14, ca. 5 km E of Shirley	48°22.81'	123°51.94'	Private	16-Nov-01	7	180 person-minutes	2003; continues to be easily found	Ovaska <i>et al.</i> 2001
13	Near Keating Lake, SW of Duncan	48°44.4'	123°47.8'	Private (forestry)	08-Nov-01	1	1 day by 5 persons	No further surveys	Ovaska <i>et al.</i> 2001
13	Near Keating Lake, SW of Duncan	48°44.4'	123°47.8'	Private (forestry)	26-Nov-01	1	ca. 120 person-minutes	No further surveys	Ovaska <i>et al.</i> 2001
Records obtained since the previous status assessment:									
9b	Sombrio Creek, east side of HWY 14 (Site 14-06)	48°30.89'	124°17.22'	BC Crown, forestry	10-Nov-06	2	66 person-minutes	No further surveys	Ovaska and Sopuck 2006a
12	Muir Creek, near Shirley (plot 2)	48°22.90'	123°52.08'	Private	22-Nov-03	4	40 person-minutes	No further surveys	Ovaska and Sopuck 2004
14a	East Sooke Regional Park, Anderson Cove (site 5)	48°21.68'	123°39.64'	CRD Regional Park	10-Oct-03	1	40 person-minutes	2009 near same site; 2011 in different area of the park	Ovaska and Sopuck 2004
14b	East Sooke Regional Park, Anderson Cove	48°21.50'	123°39.73'	CRD Regional Park	03-Nov-09	1	Inspection of 20 cardboard cover-objects 4 times	2011 in different area of the park	Ovaska and Sopuck 2009
14c	East Sooke Regional Park, Park Heights	48°20.34'	123°39.78'	CRD Regional Park	17-Nov-11	1	Inspection of 20 cardboard cover-objects 3 times	Not applicable	Ovaska and Sopuck 2011
15a	Noyse Creek, tributary of Loss Creek, east of HWY 14, Plot 1 (Site 12-06)	48°30.39'	124°14.19'	BC Crown, forestry	20-Oct-06	5	120 person-minutes	No further surveys	Ovaska and Sopuck 2006a
15b	Noyse Creek, tributary of Loss Creek, east of HWY 14, Plot 2 (Site 13-06)	48°30.90'	124°13.71'	BC Crown, forestry	20-Oct-06	1	90 person-minutes	No further surveys	Ovaska and Sopuck 2006a
16	Bamfield Marine Station	48°49.90'	125°8.01'	Private	26-Jul-07	1			CDC EO 15
16	Bamfield Marine Station	48°49.90'	125°8.01'	Private	13-Aug-08	1			CDC EO 15
17	Galloping Goose Trail at Sooke River Rd., Sooke (Plot 3)	48°24.91'	123°42.33'	CRD Regional Trail (narrow, 15 m strip on side of trail) bordered by private land	25-Oct-06	1	Inspection of 100 cardboard cover-objects 4 times	Resurveyed repeatedly in 2007 and 2008 but species not found	Ovaska and Sopuck 2006b
17	Galloping Goose Trail at Sooke River Rd., Sooke (Plot 3)	48°24.91'	123°42.33'	CRD Regional Trail (narrow, 15 m strip on side of trail) bordered by private land	06-Nov-06	1	Inspection of 100 cardboard cover-objects 4 times	Resurveyed repeatedly in 2007 and 2008 but species not found	Ovaska and Sopuck 2006b

[†]Approximate.

*Based on maps and descriptions of sites from R. Cameron (pers. comm. by R. Forsyth in 2001).



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2013)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.



Environment
Canada

Environnement
Canada

Canadian Wildlife
Service

Service canadien
de la faune

Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.